

A new genus and species of Ctenopelmatinae (Hymenoptera, Ichneumonidae) from China

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Abstract

A new genus, *Unicarinata* Sheng, Li & Sun, **gen. nov.**, of the ichneumonid subfamily Ctenopelmatinae, is described for one new species, *Unicarinata ventralis* Sheng, Li & Sun, **sp. nov.** The new genus is similar to *Syntactus* Förster, 1869 or *Pion* Schiødte, 1839, and different in having the propodeum with only one median transverse carina, areas and lateromedian longitudinal carinae entirely absent, tergite 1 straight, tergite 2 shagreened, impunctate, ovipositor straight. Types were collected from Mts Emei, Laojun, and Wawu in the Giant Panda National Park, Sichuan Province, Mts Fanjing and Leigong, Guizhou Province, and Mt Dayao, Guangxi Zhuang Autonomous Region, China.

Keywords

Darwin wasp, Giant Panda National Park, new species, Pionini, *Unicarinata*

Introduction

The Ctenopelmatinae are a large subfamily of ichneumonid wasps currently comprising 110 genera and 1617 described species, most of which are koinobiont endoparasitoids of sawflies of the superfamilies Pamphilioidea and Tenthredinoidea (Aubert 2000; Yu

et al. 2016; Khalaïm et al. 2019; Kasparyan 2020a, b, 2021; Sheng et al. 2020, 2022; Sun et al. 2021a, b; Watanabe 2021; Li and Sun 2022). The subfamily is subdivided into nine tribes, eight of which have been reported in China (Townes 1970; Yu et al. 2016; Sheng et al. 2020).

The tribe Pionini Smith & Shenefelt, 1955, comprises 20 genera (Townes 1970; Gauld 1984; Aubert 1993; Wang and Yan 1998; Kasparyan 2020a), eight of which have been reported in China (Hinz 1986; Wang and Yan 1998; Sun and Sheng 2012; Sheng et al. 2013, 2020; Sheng and Sun 2014; Yu et al. 2016). Hitherto, one endemic genus, *Celata* Wang, 1998, and 50 species have been reported in China (Yu et al. 2016; Sheng et al. 2020).

In the last three years the authors have been studying the ichneumonids of Mts Emei, Guanwu, Jiuzhaigou, Laojun, Qionglai, and Wawu (Giant Panda National Park), Sichuan Province, situated along the upper reaches of the Yangtze River, which belongs to the southern border of the Palaearctic part of China; Mts Fanjing and Leigong, Guizhou Province, and Mt Dayao, Guangxi Zhuang Autonomous Region, which belongs to the northern border of the Oriental part of China.

One species is a distinctive pionine, but proved very difficult to place in any genus, with a combination of character states that could almost feasibly place it in *Syntactus* Förster, 1869 or *Pion* Schiødte, 1839. For example, both genera have the outer face of the mandible without a basal transverse impression, lower tooth of mandible longer than upper tooth, upper end of epicnemial carina reaching the front edge of the mesopleuron, glymma absent, areolet absent. But propodeum of the new species (Fig. 8) has only one distinct median transverse carina, lack areas, the lateromedian longitudinal carinae are entirely absent, tergite 1 (Figs 13, 14) is very long and slender, straight, tergite 2 (Fig. 15) is shagreened, impunctate, and the ovipositor is straight. We hypothesized that this species represents a new genus.

Materials and methods

Specimens of the new species were collected by interception traps (IT) (Li et al. 2012) in the National Natural Reserves of Mts Emei (29°33'N, 103°19'E, 2390 m), Laojun (28°42'N, 104°01'E, 1500 m), and National Forest Park, Mt Wawu (29°40'N, 102°59'E, 1180 m), Giant Panda National Park, Sichuan Province, National Natural Reserves of Mts Fanjing (27°53'N, 108°38'E, 1250 m) and Leigong (26°22'N, 108°12'E, 1760 m), Guizhou Province, and Mt Dayao (23°57'N, 110°06'E, 1520 m), Guangxi Zhuang Autonomous Region, China.

Images were taken using a Leica M205A stereo microscope with LAS Montage MultiFocus. The final images were edited in Adobe Photoshop CC. Morphological terminology follows Gauld (1991) and Broad et al. (2018).

The type specimens are deposited in the Insect Museum, Center for Biological Disaster Prevention and Control (CBDPC), National Forestry and Grassland Administration, Shenyang, Liaoning Province, China.

Results

Taxonomy

Unicarinata Sheng, Li & Sun, gen. nov.

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Type species. *Unicarinata ventrialis* Sheng, Li & Sun, sp. nov. Monotypic.

Diagnosis. Mandible (Fig. 3) large and long, lower tooth distinctly longer than upper tooth. Occipital carina complete, genal carina joining hypostomal carina above base of mandible. Dorsal end of epicnemial carina (Fig. 4) almost reaching front edge of mesopleuron. Areolet absent (Fig. 11). Vein 2rs-m basal to vein 2m-cu. Hind vein 2-cu absent. Propodeum (Fig. 8) with one strong transverse carina level with posterior edge of spiracle. Tergite 1 (Fig. 13) very long and slender; latero-median carina absent, dorso-lateral carina present after spiracle; spiracle located slightly anterior to middle; tergite and sternite fused; glymma absent. Ovipositor sheath (Fig. 12) almost extending to apex of metasoma. Ovipositor slender and straight.

Etymology. The name of the new genus is derived from the propodeum having one strong transverse carina. The gender is feminine.

Remarks. The new genus is similar to *Syntactus* Förster, 1869 in having the apical margin of the clypeus blunt; base of the mandible without a transverse impression; dorsal end of epicnemial carina almost reaching the front edge of the mesopleuron; glymma absent; areolet absent; however, it can easily be distinguished from *Syntactus* by the following characters in combination: apical margin of clypeus medially almost truncate (Fig. 3); propodeum with only one strong transverse carina (Fig. 8); area superomedia entirely absent; hind vein 1-cu opposite cu-a; vein 2-cu absent; tergite 1 (Figs 12–14) very slender, straight; tergite 2 (Fig. 15) granulate; and ovipositor (Fig. 12) straight. In *Syntactus* the apical margin of the clypeus is almost evenly arcuate; propodeum is completely areolated, area superomedia at least partly present; tergite 1 relatively slender, decurved; tergite 2 smooth; and ovipositor upcurved.

In Townes' (1970) key to Pionini genera, the new genus can be inserted as follows:

- 2 Outer face of mandible without a basal transverse impression. Subbasal part of lower edge of mandible sharp. Areolet absent..... **3**
- Outer face of mandible with a basal transverse impression. Subbasal part of lower edge of mandible rounded. Areolet present or absent..... **4**
- 3 Propodeum (Fig. 8) with only one distinct median transverse carina, latero-median longitudinal carinae entirely absent. Tergite 1 very slender, straight (Figs 12–14). Tergite 2 (Fig. 15) shagreened, without punctures. Ovipositor (Fig. 12) straight..... ***Unicarinata* Sheng, Li & Sun, gen. nov.**
- Propodeum at least with posterior transverse carina, lateromedian longitudinal carinae present. Tergite I decurved. Tergite II smooth, punctate. Ovipositor upcurved..... **3'**

***Unicarinata ventrialis* Sheng, Li & Sun, sp. nov.**

<https://zoobank.org/E7315381-2D50-4762-892C-19C04EABBF21>

Figs 1–23

Material examined. *Holotype*, ♀ (CBDPC), CHINA: Ernianping, National Natural Reserves of Mt Laojun, Sichuan Province, 28°42'N, 104°01'E, 1500 m, 25. VIII. 2019, leg. Tao Li (IT). *Paratypes*, 1♂ (CBDPC), CHINA: Lingjue Temple, National Natural Reserves of Mt Emei, Sichuan Province, 29°33'N, 103°19'E, 2390 m, 22. VIII. 2019, leg. Peng-Suo Luo (IT); 1♀2♂ (CBDPC), CHINA: Lingjue Temple, National Natural Reserves of Mt Emei, Sichuan Province, 29°32'N, 103°19'E, 2310 m, 10. VIII. 2020, leg. Peng-Suo Luo (IT); 1♂ (CBDPC), China: Lingjue Temple, National Natural Reserves of Mt Emei, Sichuan Province, 29°33'N, 103°19'E, 2390 m, 30. VIII. 2020, leg. Peng-Suo Luo (IT); 1♀ (CBDPC), CHINA: National Natural Reserves of Mt Leigong, Guizhou Province, 26°22'N, 108°12'E, 1760 m, 18. V. 2019, leg. Wan-Xin Pan (IT); 1♂ (CBDPC), CHINA: Yapanlin, National Natural Reserves of Mt Fanjing, Guizhou Province, 27°53'N, 108°38'E, 1250 m, 13. IX. 2019, leg. Mao-Fei Tian (IT); 1♀ (CBDPC), CHINA: National Forest Park of Mt Wawu, Giant Panda National Park, Sichuan Province, 29°40'N, 102°59'E, 1180 m, 15. VI. 2020, leg. Gui-Ru Kang (IT); 1♀2♂ (CBDPC), CHINA: National Forest Park of Mt Wawu, Giant Panda National Park, Sichuan Province, 29°40'N, 102°59'E, 1180 m, 13. IX. 2020, leg. Gui-Ru Kang (IT); 1♂ (CBDPC), same data as holotype, except 1. VI. 2021; 1♂ (CBDPC), same data as holotype, except 21. VI. 2021; 2♀3♂ (CBDPC), same data as holotype except 17. IX. 2021; 2♀10♂ (CBDPC), CHINA: Shengtangshan, National Natural Reserves of Mt Dayao, Guangxi Zhuang Autonomous Region, 23°57'N, 110°06'E, 1520 m, 15. X. 2021, leg. Tao Li (IT); 1♀4♂ (CBDPC), CHINA: Shengtangshan, National Natural Reserves of Mt Dayao, Guangxi Zhuang Autonomous Region, 23°57'N, 110°06'E, 1520 m, 21. X. 2021, leg. Tao Li (IT); 1♀6♂ (CBDPC), CHINA: Shengtangshan, National Natural Reserves of Mt Dayao, Guangxi Zhuang Autonomous Region, 23°57'N, 110°06'E, 1520 m, 15. X. 2021, leg. Tao Li (IT).

Description. Female. Body (Fig. 1) length 6.4 to 7.8 mm. Fore wing length 5.7 to 6.8 mm. Ovipositor sheath length 0.4 to 0.5 mm.

Head. Inner margins of eyes (Fig. 3) slightly convergent ventrally. Face (Fig. 3) approximately 1.2× as wide as long, shining with fine granular microsculpture and dense yellowish brown setae, median portion evenly longitudinal convex with rough punctures. Clypeus (Fig. 3) 2.5× as wide as long, convex from basal to apical portions; apical margin arched and truncate. Mandible (Fig. 3) large and long, with dense setae medially; lower tooth distinctly longer than upper tooth. Malar space shiny, about 0.4× as long as basal width of mandible. Maxillary palp (Fig. 4) with five segments, extending to mid coxa. Gena (Fig. 4) evenly convergent backward, shiny, with dense yellowish brown setae. Vertex (Fig. 5) with the same texture as gena; posteromedian portion distinctly oblique. Postocellar line approximately 0.8× as long as ocular-ocellar line. Frons almost flat, slightly concave above antennal socket. Antenna with 42 to 46 flagellom-



Figure 1–2. *Unicarinata ventrialis* Sheng, Li & Sun, sp. nov. Holotype, ♀ (CBDPC) **1** habitus, lateral view **2** habitus, lateral view. Paratype, ♂. Scale bars: 2 mm (**1**, **2**).

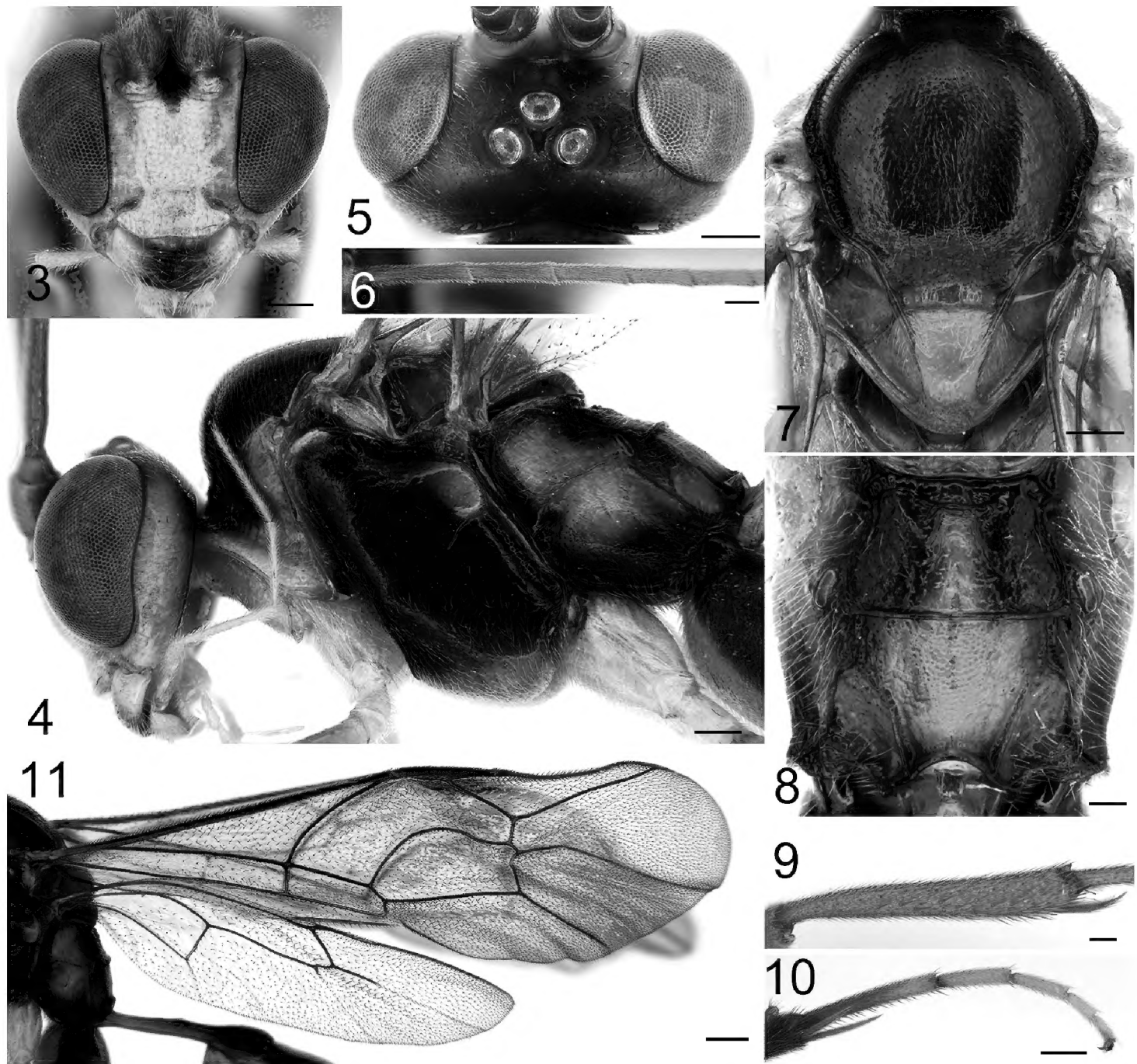


Figure 3–11. *Unicarinata ventralis* Sheng, Li & Sun, sp. nov. Holotype, ♀ (CBDPC) **3** head, anterior view **4** head and mesosoma, lateral view **5** head, dorsal view **6** basal of flagellomeres, ventral view **7** mesoscutum and scutellum, dorsal view **8** propodeum, dorsal view **9** fore tibia, lateral view **10** hind tarsus, lateral view **11** wings. Scale bars: 0.2 mm (**3–7**); 0.1 mm (**8, 9**); 0.4 mm (**10, 11**).

eres; ratio of length from first to fifth flagellomeres (Fig. 6): 1.8:1.4:1.2:1.1:1.0. Occipital carina complete, genal carina joining hypostomal carina above base of mandible.

Mesosoma. Pronotum (Fig. 4) shiny, dorsal half of concavity with fine oblique wrinkles; dorsal margin with dense yellowish setae. Epomia absent. Mesoscutum (Fig. 7) convex, shiny, with dense yellowish setae; median portion slightly longitudinally concave, with coarse texture. Notaulus distinct on anterior portion of mesoscutum. Scuto-scutellar groove deep, shiny, with fine longitudinal wrinkles. Scutellum (Fig. 7) distinctly convex, shiny, with sparse setae; lateral carina distinct, extending to median portion. Posteromedian part distinctly convex, with finely granulate; anterior portion concave. Mesopleuron (Fig. 4) almost flat, shiny, lower half with evenly dense yellowish-brown setae; upper portion under subtegular ridge with sparse setae. Speculum relatively large, slightly convex, shiny. Episternal scrobe as shallow transverse

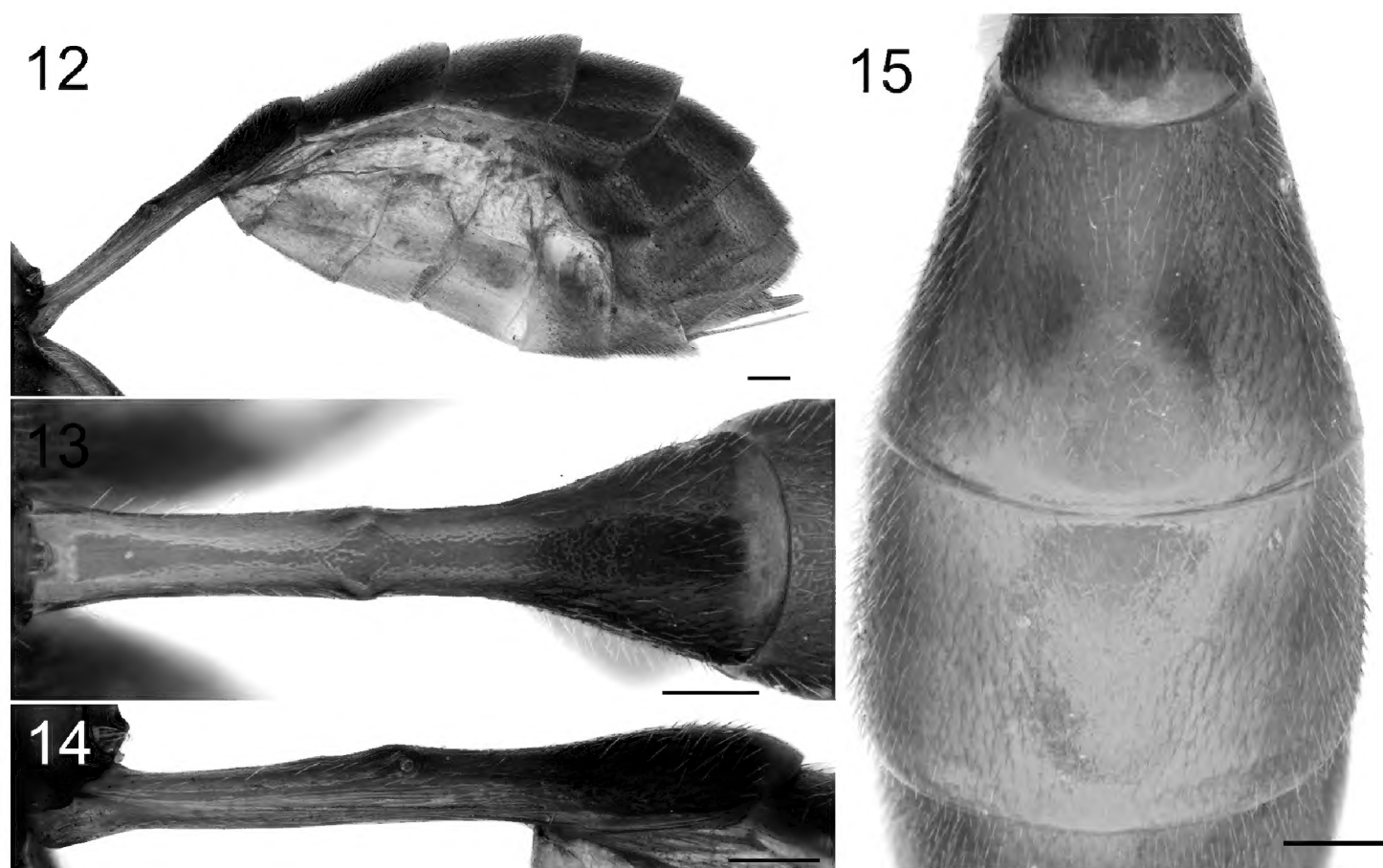


Figure 12–15. *Unicarinata ventrialis* Sheng, Li & Sun, sp. nov. Holotype, ♀ (CBDPC) **12** metasoma, lateral view **13** tergite 1, dorsal view **14** tergite 1, lateral view **15** tergites 2, 3 dorsal view. Scale bars: 0.2 mm (**12–15**).

groove. Dorsal end of epicnemial carina almost reaching front edge of mesopleuron, about 0.8 of distance to subtegular ridge. Mesosternum (Figs 4, 18) relatively short and evenly convex. Metapleuron (Fig. 4) slight convex, dorsal and median parts shiny, lower part finely granulate; ventro-posterior corner with oblique wrinkles. Juxtacoxal carina complete. Legs slender; claws simple. Fore tibia (Fig. 9) with distinct apical tooth; anterior and apical part with spines. Hind coxa (Fig. 1) conical, dorsally longitudinally concave with fine granular texture; inner spur (Fig. 10) 0.6× as long as first tarsomere. Ratio of length from first to fifth hind tarsomeres (Fig. 10): 4.2:2.2:1.7:1.0:1.0. Wings (Fig. 11) slightly infusate. Fore wing with vein 1cu-a opposite M&RS. Areolet absent. Vein 3rs-m absent. Vein 2rs-m basal to vein 2m-cu by 0.5× length of vein 2rs-m. Vein CU slightly shorter than 2cu-a. Hind vein M+CU strongly curved. Vein 1-cu opposite cu-a. Vein 2-CU absent. Propodeum (Fig. 8) slightly convex, shiny, with fine granular texture, with one strong transverse carina at level of posterior edge of spiracle; basal median part with one arched transverse carina or irregular wrinkles (Figs 19, 21); lateromedian longitudinal carinae present anteriorly, weak, strongly diverging posteriorly; lateral longitudinal carina interrupted under transverse carina; pleural carina complete; propodeal spiracle reniform, 3.1× as long as width.

Metasoma (Fig. 12). Tergite 1 (Fig. 13) 7.3× as long as anterior width, 3.5× as long as posterior width; margins parallel, evenly widened posteriorly; anterior half shiny, posterior half with fine granular texture; posterior part with dense yellowish setae; latero-median carina absent, dorso-lateral carina present posterior to spiracle, ventro-lateral carina complete; spiracle small, circular, located slightly anterior to middle; glymma absent; anterior sclerotized section (Fig. 14) strongly convex; tergite and sternite fused;

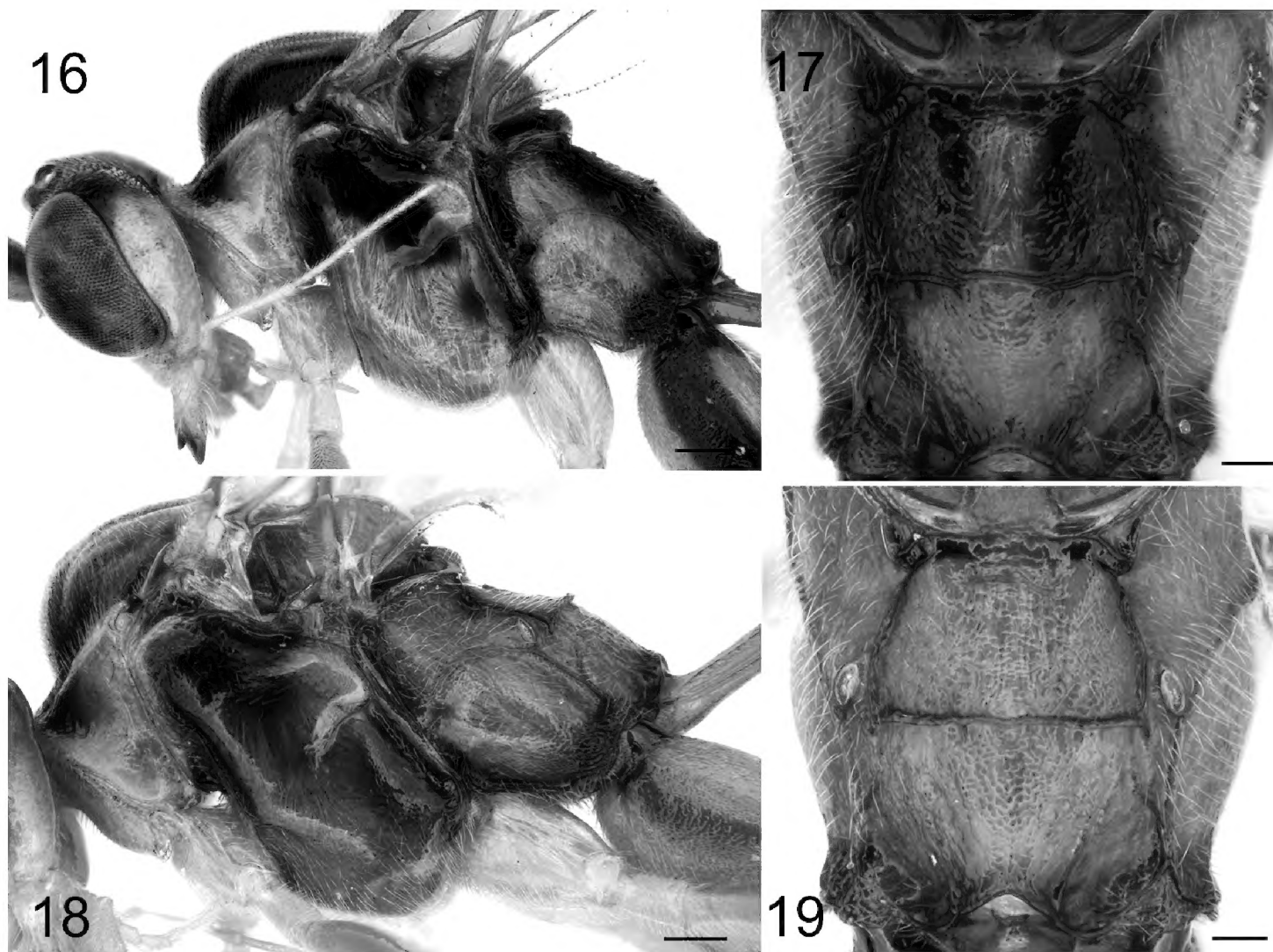


Figure 16–19. *Unicarinata ventrialis* Sheng, Li & Sun, sp. nov. Paratypes (CBDPC) **16** head and Mesosoma, lateral view, ♂ **17** propodeum, dorsal view, ♂ **18** mesosoma, lateral view, ♀ **19** propodeum, dorsal view, ♀. Scale bars: 0.2 mm (**16**, **18**); 0.1 mm (**17**, **19**).

sternite 1 extending to posterior 0.3 of tergite 1. Tergite 2 (Fig. 15) trapezoidal, 1.3× as long as anterior width, 0.8× as long as posterior width, with evenly spaced fine yellowish-brown setae. Tergite 3 (Fig. 15) almost rectangular, 0.7× as long as anterior width, with the same microsculpture as tergite 2. Tergites 4–8 shiny, with evenly spaced fine yellowish-brown setae; posterior half of tergite 4–8 compressed. Ovipositor sheath (Fig. 12) almost extending to apex of metasoma. Ovipositor slender and straight.

Coloration. Body (Fig. 1) yellowish brown to brown, mesosoma (Fig. 4) with blackish brown spots or reddish brown (Fig. 18), propodeum reddish brown (Fig. 19) or black-brown (Fig. 21), except for following: face, clypeus, mandible (teeth brown), gena, maxillary palpi, labial palpi, fore and mid coxae, trochanters, third to fifth hind tarsomeres, yellowish white. Median part of frons, occiput, temple and vertex, black-brown with some reddish. Median and upper parts of pronotum, mesoscutum, mesopleuron, except subtegular ridge and speculum, upper division of metapleuron, lower half of metapleuron, area basalis, area dentipara, dorsum of hind coxa except median spot, subapical part of tergite 1, and lateral part of tergite 2, dark brown to black-brown. Hind femur and tibia brown to reddish brown. Proximal and apical parts of flagellum, pterostigma and veins, brown to brownish black.

Male. Body (Fig. 2) length 5.8 to 6.7 mm. Fore wing length 5.4 to 6.0 mm. Antenna with 41 to 45 flagellomeres. Propodeum (Fig. 17) with fine oblique wrinkles at ante-

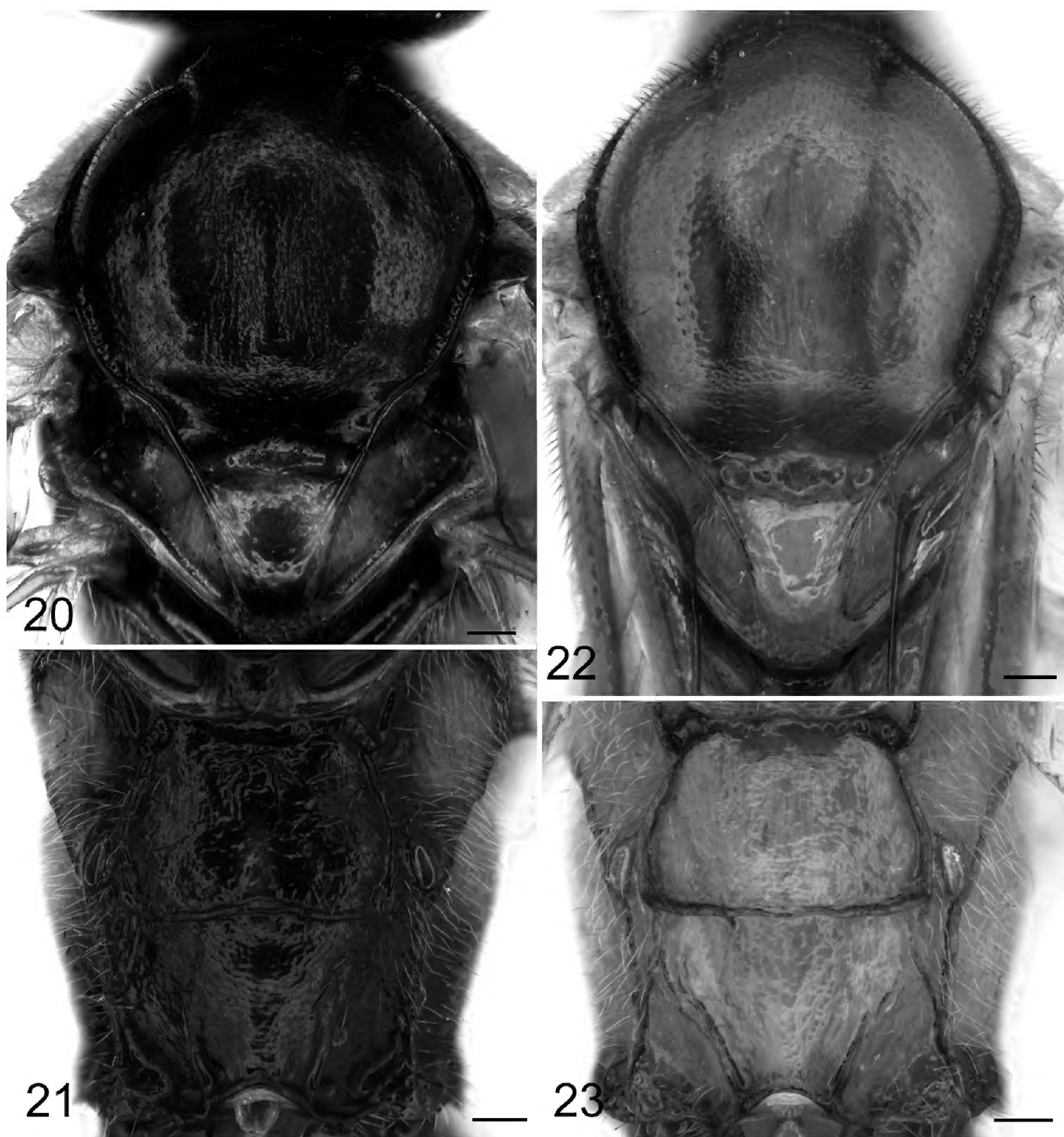


Figure 20–23. *Unicarinata ventrialis* Sheng, Li & Sun, sp. nov. Paratypes (CBDPC) **20** mesoscutum and scutellum, dorsal view, ♀ **21** propodeum, dorsal view, ♀ **22** mesoscutum and scutellum, dorsal view, ♂ **23** propodeum, dorsal view, ♂. Scale bars: 0.1 mm (**20–23**).

riorly, sub-laterally, or with transverse carina (Fig. 23), posterior half with fine granular texture; sub-median section of transverse carina interrupted; lateromedian longitudinal carinae absent; apical of lateral longitudinal carina vestigial. Body brown, mesosoma (Fig. 16) with blackish brown spots, except for following: posterior longitudinal spots dark reddish. Median and lower half of mesopleuron, metapleuron except lower-posterior corner, yellowish brown to brown; mesoscutum (Fig. 22) reddish brown except sub-median irregular spots with dark reddish. Other characteristics as in female.

Distribution. China (Guangxi, Guizhou, Sichuan).

Etymology. The specific name is derived from the short and evenly convex mesosternum.

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